

# Notice of Allowability

Application No.

10/720,599

Examiner

Cindy D. Khuu

Applicant(s)

ROTHMAN ET AL.

Art Unit

2863

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 05/25/06 phone interview.
2. ☒ The allowed claim(s) is/are 2-4, 7, 8, 12-14, 17, 18 and 21-37.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
  1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

## Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 4/1/05
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_\_.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

## DETAILED ACTION

### *Examiner's Amendment*

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given by Mr. Robert Crawford during a telephone interview on 05/25/2006.

The application has been amended as follows to meet the 35 U.S.C 101 claim statutory subject matter:

Replace claim 23 as followed:

-- A method of determining an average flow rate of a fluid flowing in the pipe, said method comprising:  
measuring unsteady pressures using an array of sensors, wherein each sensor is spaced at different axial locations along the pipe;  
determining, in response to the measured unsteady pressures, a measured flow rate of the fluid flow; and  
relating the measured flow rate to the average flow rate of the fluid flow using a calibration correction function based on non-dimensional parameters that characterize the array of sensors, the pipe, and the fluid flowing in the pipe to determine a flow signal indicative of the average flow rate, and providing the average flow rate to an output device for retrieval by a user.  
wherein the calibration correction function depends on at least two of a ratio  $t/D$  of the pipe wall thickness ( $t$ ) and the pipe inner diameter ( $D$ ); a Reynolds number that characterizes the fluid flow in the pipe; a ratio  $\Delta x/D$  of the sensor spacing ( $\Delta x$ ) and the pipe inner diameter ( $D$ ); and a ratio  $f\Delta x/U_{meas}$  of usable frequencies in relation to the sensor spacing ( $\Delta x$ ) and the measured flow rate ( $U_{meas}$ ). --

Replace claim 24 as followed:

-- A method of determining an average flow rate of a fluid flowing in the pipe, said method comprising:  
measuring unsteady pressures using an array of sensors, wherein each sensor is spaced at different axial locations along the pipe;

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determining, in response to the measured unsteady pressures, a measured flow rate of the fluid flow; and

relating the measured flow rate to the average flow rate of the fluid flow using a calibration correction function based on non-dimensional parameters that characterize the array of sensors, the pipe, and the fluid flowing in the pipe to determine a flow signal indicative of the average flow rate, and providing the average flow rate to an output device for retrieval by a user.

wherein the calibration correction function depends on a ratio  $t/D$  of the pipe wall thickness ( $t$ ) and the pipe inner diameter ( $D$ ). --

Replace claim 25 as followed:

-- A method of determining an average flow rate of a fluid flowing in the pipe, said method comprising:

measuring unsteady pressures using an array of sensors, wherein each sensor is spaced at different axial locations along the pipe;

determining, in response to the measured unsteady pressures, a measured flow rate of the fluid flow; and

relating the measured flow rate to the average flow rate of the fluid flow using a calibration correction function based on non-dimensional parameters that characterize the array of sensors, the pipe, and the fluid flowing in the pipe to determine a flow signal indicative of the average flow rate, and providing the average flow rate to an output device for retrieval by a user.

wherein the calibration correction function depends on a ratio  $\Delta x/D$  of the sensor spacing ( $\Delta x$ ) and the pipe inner diameter ( $D$ ). --

Replace claim 26 as followed:

-- A method of determining an average flow rate of a fluid flowing in the pipe, said method comprising:

measuring unsteady pressures using an array of sensors, wherein each sensor is spaced at different axial locations along the pipe;

determining, in response to the measured unsteady pressures, a measured flow rate of the fluid flow; and

relating the measured flow rate to the average flow rate of the fluid flow using a calibration correction function based on non-dimensional parameters that characterize the array of sensors, the pipe, and the fluid flowing in the pipe to determine a flow signal indicative of the average flow rate, and providing the average flow rate to an output device for retrieval by a user.

wherein the calibration correction function depends on a ratio  $f\Delta x/U_{meas}$  of usable frequencies in relation to the sensor spacing ( $\Delta x$ ) and the measured flow rate ( $U_{meas}$ ). --

Replace claim 27 as followed:

-- A method of determining an average flow rate of a fluid flowing in the pipe, said method comprising:

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measuring unsteady pressures using an array of sensors, wherein each sensor is spaced at different axial locations along the pipe;

determining, in response to the measured unsteady pressures, a measured flow rate of the fluid flow; and

relating the measured flow rate to the average flow rate of the fluid flow using a calibration correction function based on non-dimensional parameters that characterize the array of sensors, the pipe, and the fluid flowing in the pipe to determine a flow signal indicative of the average flow rate, and providing the average flow rate to an output device for retrieval by a user.

wherein the calibration correction function is defined by a calibration curve, the calibration curve being defined by an equation:

$$\text{Offset} = C_0 + C_1/RE^{C_2},$$

wherein Offset is the correction in percentage, RE is the Reynolds number of the fluid, and  $C_0$ ,  $C_1$  and  $C_2$  are constants to define the calibration curve, which are related to the non-dimensional parameters.

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Replace claim 29 as followed:

-- A method of determining an average flow rate of a fluid flowing in the pipe, said method comprising:

measuring unsteady pressures using an array of sensors, wherein each sensor is spaced at different axial locations along the pipe;

determining, in response to the measured unsteady pressures, a measured flow rate of the fluid flow; and

relating the measured flow rate to the average flow rate of the fluid flow using a calibration correction function based on non-dimensional parameters that characterize the array of sensors, the pipe, and the fluid flowing in the pipe to determine a flow signal indicative of the average flow rate, and providing the average flow rate to an output device for retrieval by a user.

wherein a common calibration correction function is used to determine the average flow rate for meters having similar sensor spacing, used on pipes having similar inner diameters and wall thickness, and measuring fluids having similar Reynolds numbers. --

### ***Allowable Subject Matter***

Claims 2-4, 7-8, 12-14, 17-18 and 21-37 are allowed.

Please see Applicant's response filed 5/18/06 for reasons of allowable subject matter.

***Fax/Telephone Information***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cindy D. Khuu whose telephone number is (571) 272-8585. The examiner can normally be reached on M-F, 7:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (571) 272-2269. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CME

5/25/06

  
John Barlow  
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